

was shown that whilst sudden changes of temperature cause immediate variation in the quantity of carbonic acid, a medium degree of temperature, as of 60°, is accompanied by all the variations in the quantity of carbonic acid, and that there is no relation between any given temperature and quantity of carbonic acid at different seasons. Whatever was the degree of temperature, the quantity of carbonic acid, and all other phenomena of respiration, fell from the beginning of June to the beginning of September. The author then described the influence of atmospheric pressure, and stated that neither temperature nor atmospheric pressure accounts for the seasonal changes.

The kinds of exertion which had been investigated were walking and the treadwheel. Walking at two miles per hour induced an exhalation of 18·1 gr. of carbonic acid per minute, and at three miles per hour of 25·83 grs. ; whilst the effect of the treadwheel at Cold-bath Fields Prison was to increase the quantity to 48 grs. per minute. All these quantities vary with the season, and hence the author recommends the adoption of relative quantities, the comparison being with the state of the system at rest, and apart from the influence of food.

The apparatus and various drawings were exhibited.

January 27, 1859.

Sir BENJAMIN C. BRODIE, Bart., President, in the Chair.

Dr. John Hutton Balfour was admitted into the Society.

In accordance with notice given at the last Meeting, the Right Rev. the Lord Bishop of London was proposed for election and immediate ballot.

The ballot having been taken, his Lordship was declared duly elected.

The following communications were read :—

- I. "On the Effect of Pressure on Electric Conductibility in Metallic Wires." In a Letter from M. ELIE WARTMANN of Geneva, to Major-General SABINE, Treas. and V.P.R.S. Communicated by Prof. W. H. MILLER, For. Sec. R.S. Received January 12, 1859.

Geneva, January 3rd, 1859.

My dear Sir,—The newspapers having reported that a society of English shareholders intends to lay a second cable for transatlantic telegraphy, you will allow me to give here a brief account of some experiments by which I have succeeded in proving the effect of pressure on electric conductibility in metallic wires.

The method which I have resorted to is the one devised by MM. Christie and Wheatstone, which is called the electrical bridge. The current of a Bunsen's battery of six large cells was divided between the wire to be tested (a very soft copper wire 0.05 of an inch in diameter, and covered with gutta percha) and another conductor; both being connected with a delicate Ruhmkorff's galvanometer, so that the needle remained on the zero point. All contacts were made invariable by solderings.

No sensible effect being determined by the pressure of nine atmospheres in a piezometer, I made use of a press which enabled me to produce compressions superior to four hundred atmospheres, consequently superior to that which is suffered by an electric conductor immersed in the ocean, at a depth of 12,420 English feet. The wire, besides its coating, was preserved against permanent deformation by two sheets of thick gutta percha, placed between the steel plates which took hold of it.

The experiments have shown—

1°. That a pressure of thirty atmospheres (a number relative to the sensibility of the galvanometer) diminishes the conducting power of a copper wire for electricity.

2°. That the effect increases with the pressure.

3°. That the diminution remains the same for each compression, as long as the latter does not vary.

4°. That the primitive conducting power is exactly restored when the pressure vanishes altogether.

Many interesting results flow from these conclusions, which I pro-

pose to examine in a future letter. For the present, permit me to add, that the fact which I have discovered establishes a new connexion between electricity, heat, and light: for it has been demonstrated by M. de Senarmont—

a. That any artificial increase of density in a non-crystallized solid body diminishes, in the direction in which it is exerted, the conducting power of that body for heat.

b. That in homogeneous media which are in a state of artificial molecular equilibrium, the conformation of the thermic ellipsoid, either oblate or prolate, is always corresponding to that of the optic one.

I shall feel much gratified if you deem this communication worthy to be laid before the Royal Society. * *

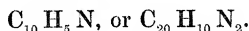
I remain, &c.,

ELIE WARTMANN.

II. "Notice of Researches on a New Class of Organic Bases, conducted by CHARLES S. WOOD, Esq." By A. W. HOFMANN, LL.D., F.R.S. Received December 21, 1858.

In his remarkable memoir* on the action of reducing agents on nitro-compounds, in which Zinin first pointed out the formation of organic bases by the substitution of hydrogen for oxygen, some experiments are recorded on the deportment of dinitro-naphtalin (nitro-naphtalese) with sulphuretted hydrogen. Zinin states that this process gives rise to the formation of a basic compound crystallizing in delicate copper-red needles, and yielding with acids white scaly salts.

In a subsequent paper† Zinin returns to the action of sulphuretted hydrogen or dinitronaphtalin, and gives a fuller account of the products obtained in this process. The basic substance arising from dinitronaphtalin crystallizes in colourless needles of great brilliancy, which contain



It is a well-defined basic body, which Zinin describes under the name of seminaphthalidam. From this later communication it would

* Bulletin Scientifique de St. Pétersburg, x. 18.

† Journ. für Prakt. Chem. Bd. xxxiii. 29.